

U. S. DEPARTMENT OF AGRICULTURE,

BUREAU OF SOILS—MILTON WHITNEY, Chief.

SOIL SURVEY OF MADISON COUNTY, TENNESSEE.

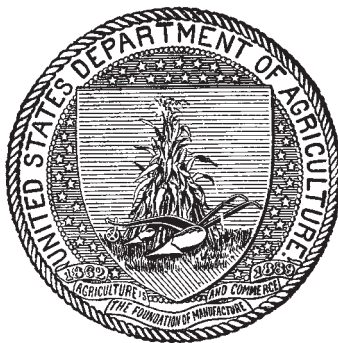
BY

W. S. LYMAN, FRANK BENNETT,

AND

W. E. McLENDON.

[Advance Sheets—Field Operations of the Bureau of Soils, 1906.]



WASHINGTON:

GOVERNMENT PRINTING OFFICE.

1907.

[PUBLIC RESOLUTION—No. 9.]

JOINT RESOLUTION Amending public resolution numbered eight, Fifty-sixth Congress, second session, approved February twenty-third, nineteen hundred and one, "providing for the printing annually of the report on field operations of the Division of Soils, Department of Agriculture."

Resolved by the Senate and House of Representatives of the United States of America in Congress assembled, That public resolution numbered eight, Fifty-sixth Congress, second session, approved February twenty-third, nineteen hundred and one, be amended by striking out all after the resolving clause and inserting in lieu thereof the following:

That there shall be printed ten thousand five hundred copies of the report on field operations of the Division of Soils, Department of Agriculture, of which one thousand five hundred copies shall be for the use of the Senate, three thousand copies for the use of the House of Representatives, and six thousand copies for the use of the Department of Agriculture: *Provided*, That in addition to the number of copies above provided for there shall be printed, as soon as the manuscript can be prepared, with the necessary maps and illustrations to accompany it, a report on each area surveyed, in the form of advance sheets, bound in paper covers, of which five hundred copies shall be for the use of each Senator from the State, two thousand copies for the use of each Representative for the Congressional district or districts in which the survey is made, and one thousand copies for the use of the Department of Agriculture.

Approved, March 14, 1904.

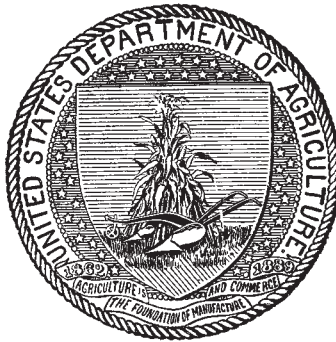
[On July 1, 1901, the Division of Soils was reorganized as the Bureau of Soils.]

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LETTER OF TRANSMITTAL.

U. S. DEPARTMENT OF AGRICULTURE,
BUREAU OF SOILS,
Washington, D. C., March 20, 1907.

SIR: A request was formulated by the mayor and aldermen and members of the Chamber of Commerce of Jackson, Tenn., and indorsed and transmitted by Hons. T. W. Simms and J. B. Frazier, for a soil survey of Madison County, Tenn. This survey was made during the summer of 1906 for the purpose of determining the possibilities of reclaiming certain poorly drained and overflowed lands of the county and to determine the different soils occurring in these lands and their agricultural adaptation when reclaimed, as well as to study the adaptations of other soils in the county. I recommend the publication of the report and map covering this work as advance sheets of the Field Operations of the Bureau of Soils for 1906, as authorized by law.

Respectfully,

MILTON WHITNEY,
Chief of Bureau.

HON. JAMES WILSON,
Secretary of Agriculture.

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MAP.

Soil map, Madison County sheet, Tennessee.

SOIL SURVEY OF MADISON COUNTY, TENNESSEE.

By W. S. LYMAN, FRANK BENNETT, and W. E. McLENDON.

DESCRIPTION OF AREA.

Madison County, which occupies an area of 359,104 acres, or about 561 square miles, lies in the west-central part of the State. It is bounded on the north by Gibson and Carroll, on the east by Henderson, on the southeast by Chester, on the south by Hardeman, on the west by Haywood, and on the northwest by Crockett counties.

The general topographic features of the county vary from gently rolling to hilly. The eastern and southern parts of the county embrace the rough and hilly section. This section is characterized by a

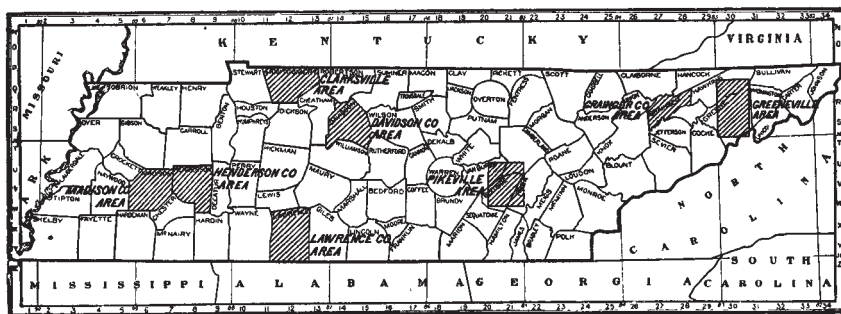


FIG. 1.—Sketch map showing location of the Madison County area, Tennessee.

series of long, narrow, winding ridges, forming divides between numerous stream courses. But little of this section is cultivated, and only such areas as are cropped are fenced. The gently rolling section of the uplands lying to the west and north comprises about two-thirds of the entire county. There also occur along the streams and rivers of the county level and poorly drained bottom lands. These have an average width of $1\frac{1}{2}$ miles along the South Fork of Deer River.

The county lies wholly within the Mississippi River drainage basin, and the drainage is toward the west. The greater part of the run-off is carried by the South Fork of Deer River, which flows through the central part. The Middle Fork of Deer River drains some of the

northern part, and tributaries of the Hatchie River drain a small section of the southeast corner of the area.

Artesian water has been found in the lower areas bordering the South Fork of Deer River. Two wells have been bored in the area, the largest of which is located at Jackson and furnishes the water supply for the city. The other is located at Pinson. It is highly probable that artesian water could be obtained in all the lower areas bordering the South Fork of Deer River.

In 1821, when the first court of the county was organized, there were but few settlers in the county, and immigration, which was largely from Virginia, the Carolinas, and Georgia, was rather slow for a few years. After the building, in 1857, of what is now the Illinois Central Railroad, and of the Mobile and Ohio Railroad a year later, immigration rapidly increased, though not to such an extent as to cause a boom. During the past two or three years a large number of farms have changed hands. This, together with the fact that many new dwellings are building, and that the county has expended \$300,000 for macadamized roads, is indicative of the growth and prosperity of the rural population at the present time. From the first the more level and gently rolling uplands have been more thickly settled than the remainder of the county. But few cultivated fields are found in the hilly section. The bottom lands are also sparsely settled, but clearings are now being made quite rapidly.

The city of Jackson, which is the county seat, is the only town of importance in the area. Being centrally located and an important railroad town, it affords an excellent market and shipping point. Besides having direct connections with points both north and south on the Illinois Central and the Mobile and Ohio railroads it is connected with points east and west by the Nashville, Chattanooga and St. Louis Railroad. A branch line of the Illinois Central Railroad is now nearly completed, by which connections will be made with Birmingham, Ala. Over these railroads excellent markets for tomatoes, strawberries, and other vegetables which might be grown can be quickly reached. Shipments to both Chicago and New Orleans can be made in about thirteen hours, while St. Louis and Mobile can be reached in eight and twelve hours, respectively.

CLIMATE.

The climate of the area is very favorable to all the crops grown and would be equally as favorable to numerous others that have not yet been introduced. The summers are long and warm and the winters short and mild, except for occasional "cold snaps," when the mercury seldom falls below zero. Light snows of short duration occur every winter.

The following table gives the normal monthly and annual temperature and precipitation, as compiled from the records of the Weather Bureau station at Jackson:

Normal monthly and annual temperature and precipitation.

Month.	Jackson		Month.	Jackson.	
	Tempera- ture.	Precipi- tation.		Tempera- ture.	Precipi- tation.
	° F.	Inches.		° F.	Inches.
January	39.4	4.57	August	77.8	2.58
February	40.4	3.11	September	72.3	2.30
March	50.1	4.87	October	58.8	2.27
April	60.8	4.95	November	49.5	4.16
May	68.8	3.82	December	41.6	5.01
June	76.9	4.44	Year	59.6	46.70
July	79.0	4.59			

The rainfall is sufficiently heavy to produce excellent yields of the crops grown, but occasional droughts in middle and late summer cut some of them short. This condition would not be so noticeable if the farmers gave more attention to tilling their soils in such a way as to conserve the moisture. In the lowlands there is need of better drainage, to provide against wet seasons and overflows, which are often more disastrous than droughts.

Complete records of the killing frosts are not obtainable, but from the records covering 1897, 1898, 1899, 1900, 1901, and 1903 the average seems to be about March 28 for the last and October 31 for the first killing frost. This gives an average growing season for tender vegetation of 216 days.

AGRICULTURE.

Prior to the civil war, while transportation was crude and slow, the settlers of the county had to depend entirely upon the soil for their support. With the exception of cotton, which was shipped to a small extent, all of the crops then produced were consumed at home. The crops grown at first are still the principal products of the farms. Cotton is the main money crop, while corn is grown to a large extent. The small acreage devoted to wheat and oats is the result of the small yields obtained. Within the past few years some interest has been taken in the growing of truck crops for northern markets, and tomatoes and strawberries are now shipped to a small extent. A number of large apple orchards have recently been set out in the section of the county northeast of Jackson and if properly cared for should give good results.

The general type of agriculture in the area is capable of higher development. As in all sections where land is cheap and easily

obtained, little regard is given to keeping the soil in a good productive state. Many fields have been planted either to cotton or corn for a number of years, thus materially reducing the yields now obtained. Old fields, particularly in the more hilly section of the area, have been allowed to wash badly and have been abandoned for clearings made on the more productive virgin soils. All soils of the county respond readily to proper fertilization and can be quickly brought back to their former state of productivity.

The general farm crops of the area do best on the bottom lands, if they are well drained. Such areas, however, are few at present and are not of much importance.

But little attention is given to the rotation of crops throughout the area. The two main crops, cotton and corn, are grown continuously for long periods of years upon the same fields. A comparatively few farmers are growing clover and peas in a rotation with these staple crops. Where a rotation of crops is practiced the upland soils suffer less from erosion, and more profitable yields are continually obtained without the aid of commercial fertilizers. Some system of crop rotation is necessary on all the soils of the area in order to obtain good results. A three-year rotation of clover or peas, corn, and cotton is practiced by the more successful farmers. The practice of sowing peas in corn after the last cultivation is to be commended.

In the growing of cotton and corn, and most other crops that are intertilled, ridge cultivation is generally practiced. Often the fields are left level until the last cultivation, when the soil is ridged up in the rows and the crop "laid by," as it is called. But little attention is given to the prevention of soil washing and the formation of gullies. The practice of "laying by" crops should be abandoned, as yields are not only materially reduced by a loss of soil moisture, but some of the roots, which lie close to the surface in midsummer, are broken off, thus diminishing the crops' feeding capacity. Level cultivation, when practiced upon the uplands and where the slopes are not too steep, gives the best results, as the soil retains a larger quantity of moisture and crops suffer less from the effect of summer droughts. Terracing and contour cultivation should be practiced in the hilly sections to prevent washing.

The labor employed in the area is both white and colored and is not so easily secured nor as efficient as could be desired. Most of the help is hired by the day as needed through the busy season, and wages range from 75 cents to \$1 a day.

A large percentage of the farms of the area are operated by the owners. Some of the farmers having the largest farms rent a part of their land, caring for the remainder themselves. When land is rented cotton is usually grown. But few of the farms are rented

for cash, the more common practice being to rent on shares. The owner receives one-third of the corn and one-fourth of the cotton, if the renter furnishes the tools and work stock, but in case these are furnished by the owner he receives one-half of the crop.

The size of the farms throughout the county varies considerably. According to the census of 1900 the average size is 81.3 acres. The value of the farm lands has a wide range, according to the kind of soil and the location of the farm.

The excellent railroad facilities, the nearness to some of the large markets, and the extensive areas of soils well adapted to the growing of truck crops afford excellent opportunities for the development of the trucking industry. This branch of farming could undoubtedly be made a very profitable source of revenue to the farmers.

SOILS.

The soils of Madison County are divided naturally into two general groups—the upland soils and the bottom-land soils. Four types have been recognized in the area, the Memphis silt loam and Lexington silt loam being found in the uplands and the Waverly silt loam and Waverly loam in the bottom lands.

The derivation of the Memphis silt loam and the Lexington silt loam is identical. Both are the result of the weathering of a mantle of material known as loess, the exact origin of which is not known. It is believed by many geologists to have been laid down at about the close of the glacial period. It is thought that the fine silts borne along by the glacial streams in times of high water were spread out over broad flats and as the waters withdrew these deposits were left to dry in the sun and then picked up by the wind and drifted. This loess material overlies the stratified and cross-bedded Orange sands and clays of the Lafayette formation.

The loess, as found in Tennessee, extends over a large area covering about one-fifth of the western part of the State. At the bluff along the Mississippi River it varies from 40 to 100 feet in thickness and going eastward gradually thins out, covering Madison County to depths varying from 2 to 15 feet. Its greatest thickness in this county is found in the western and northern parts, and it becomes thinner in the eastern and southern parts.

While the Memphis silt loam and the Lexington silt loam are in some respects closely related, in others they are widely separated. The derivation of both is identical and their textures much the same, but the sandy material is considerably nearer the surface throughout the areas of Lexington silt loam, and they also represent widely different topographic and drainage features and have different crop

values. The boundary between these two types is seldom sharply defined, there being a gradual merging of one into the other.

The underlying geological formation in the upland, where exposed by erosion, is nearly always sandy. A few areas were found where the overlying loess has been entirely removed, leaving the underlying formation exposed, but such areas were never more than 5 or 6 acres in extent and were too small to be shown on the map. Occasionally in the area mapped as Lexington silt loam, this underlying sandy material is found within 2 feet of the surface. In the area mapped as Memphis silt loam the underlying formation lies considerably deeper, being exposed only in the deeper gullies.

The Waverly loam and the Waverly silt loam are alluvial soils that have been built up by the deposition of material washed down from the uplands. The heavier and coarser material is deposited first, causing the bottom along the smaller streams to be loamy, while the finer silts and clays are carried farther down and deposited in the wider bottoms along the larger streams. The coarser soil has been mapped as Waverly loam and the finer soil as Waverly silt loam.

The following table gives the names and the actual and relative extent of the soils of the county:

Areas of different soils.

Soil.	Acres.	Per cent.
Memphis silt loam.....	197,120	51.9
Lexington silt loam.....	100,928	28.1
Waverly silt loam.....	43,968	12.2
Waverly loam.....	17,088	4.8
Total.....	359,104	

MEMPHIS SILT LOAM.

The Memphis silt loam, taken as a whole, is very uniform in texture. The soil is a gray or brownish-gray silt loam, having a depth of about 8 inches. Cultivated fields are somewhat darker in color and are also more friable. The subsoil, to the depth of 36 inches or more, is a compact, yellow or brown heavy silt loam or silty clay. When wet it is somewhat sticky and tenacious, but when dry it is rather friable. In the more level areas both soil and subsoil are slightly heavier and also a trifle darker in color, a variation due principally to the greater accumulation of organic matter.

This is the most extensive soil type in the county. With the exception of two small bodies lying near Pinson and another near Medon, the type lies in a single body in the western, central, and northern parts of the county and comprises more than one-half of the

total area surveyed. This extensive area of Memphis silt loam is broken in the northern part of the county by the long, narrow strip of Waverly silt loam bordering the North Fork of Deer River, and in the central part by a wider strip of the same soil along the South Fork. It is also intersected by narrow bands of Waverly loam and Waverly silt loam marking the narrow bottoms of the numerous small tributaries of these streams.

The surface of the Memphis silt loam is gently rolling. A few small areas are found, mostly in the northwestern part of the county, where the topography is almost level, but in no section is it so level as to be poorly drained. By reason of its topography it is subject to no very serious erosion, and most of that which has taken place has occurred in the immediate vicinity of streams.

This type of soil is the result of a covering of from 5 to 15 feet of loess deposited over material of the Lafayette formation. Over the area covered by this type the underlying formation is rarely ever exposed, although it may occasionally be seen along stream courses.

The natural forest growth of white and red oak, beech, hickory, chestnut, and sweet and black gum has mostly been removed, and a very large percentage of the type is under cultivation.

The yields of the various crops depend to a large extent on the thoroughness of cultivation and the system of crop rotation.^a With the methods usually practiced in growing the two main crops, cotton and corn, cotton will average from two-fifths to three-fifths bale and corn from 20 to 35 bushels per acre. Some wheat is grown, but while the straw is plentiful the grain is light, the yields averaging not more than 6 or 8 bushels. Winter oats produce the best yields, but are not considered a remunerative crop. Clover does fairly well, yielding about 2 tons of hay per acre, but considerable trouble is encountered in securing stands. Cowpeas do very well and could often be used in place of clover, as this legume has about the same renovating effect upon the soil and the yields are about equal. This soil seems to be well adapted to strawberries and vegetables, especially tomatoes. Apples are grown with good success and peaches do well.

The Memphis silt loam now commands the highest price of any soil type in the area, and the greater part of the farming operations are

^a Results of tests by the wire-basket method show that the soil conditions are most improved by the use of stable manure or cowpeas and lime. A good increase in plant growth was secured where nitrate of soda, singly or in combination, was used. This was especially the case where it was combined with the two other principal fertilizer ingredients—sulphate of potash and acid phosphate. The two last gave some increase in growth, but not sufficient to warrant their use, except in combination with nitrate of soda. Results indicate very clearly the necessity of adding organic matter to this soil.

conducted on this type. By reason of its topography it is easy to cultivate and withstands drought well. Prices paid for this soil vary considerably, according to location, ranging from \$15 to \$75 an acre.

The following table gives the average results of mechanical analyses of typical samples of the soil and subsoil of the Memphis silt loam:

Mechanical analyses of Memphis silt loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>
15005, 15007	Soil	0.3	0.6	0.6	2.1	9.8	72.9	13.4
15006, 15008	Subsoil	0	.4	.3	.6	8.5	67.7	22.3

LEXINGTON SILT LOAM.

The soil of the Lexington silt loam consists of from 5 to 8 inches of a gray or yellowish-gray silt loam. Occasionally upon close examination a very small quantity of very fine sand is noticeable. Promiscuously scattered along the slopes occur spots of varying sizes, but never containing more than a few acres, where the surface soil has been partly washed away, causing the soil to be slightly heavier in texture, lighter in color, and less productive. Such areas are too small in extent and too scattering to be shown on the map with any degree of accuracy. In the virgin state the first 2 or 3 inches of the surface soil is usually slightly darker in color, owing to the accumulation of a small amount of organic matter. When the type is under cultivation it is usually somewhat darker in color and more friable.

The subsoil to a depth of 36 inches consists either of a compact, plastic, heavy silt loam or a silty clay, varying in color from brown to yellow. When wet it is usually quite sticky, but when dry it is rather friable. Occasionally the underlying sand comes within 2 feet of the surface, in which case varying quantities of sand are found in the lower subsoil.

The Lexington silt loam is found in one continuous body extending along the eastern and southern sides of the county. It is intersected by narrow strips of bottom lands along streams, and surrounds three small areas of Memphis silt loam in the south and southeastern parts of the county. The boundary line separating this type from the Memphis silt loam extends in a general northeast and southwest direction from a point just south of Uptonville on the south, running to the south and east of Jackson, and leaving the county north of Spring Creek.

The derivation of the Lexington silt loam is identical with that of the Memphis silt loam. The loess covering the underlying sands

and clays is not, however, so thick in the type under discussion, its depth here varying from 2 to 5 feet.

The topography of the Lexington silt loam is hilly. The greater part of the type consists of long, narrow, winding ridges, forming divides between numerous stream courses. Much of the character of the type is due to the work of erosion. Every heavy rain forms gullies, which, when once started, rapidly increase in size, some having reached depths of 30 or 40 feet.

These lands are excessively drained, owing to the hilly topography and the numerous small streams, and droughts are more injurious to crops on this type than on any other. Terracing and contour cultivation are necessary, so that more of the rainfall may be absorbed and stored in the soil for the use of crops.

The natural forest growth, which still covers this type to a great extent, consists mainly of white, red, and post oak, with some beech, chestnut, and sweet and black gum. Much of the merchantable timber has been removed, though a considerable amount still remains.

Owing to the rough and hilly character of the Lexington silt loam and the rapidity with which it erodes, it is the least desirable soil type in the area. But little of it is under cultivation. Most of the cultivated fields are found in the less hilly areas of the type lying adjacent to the Memphis silt loam. The fields under cultivation are small and very irregular in shape and are hard to cultivate. Of the crops grown, only moderate yields are obtained.^a Cotton yields from one-third to one-half bale and corn from 15 to 20 bushels per acre. Wheat and oats are grown to a very small extent, and do not often give remunerative yields. This soil seems best adapted to the production of such fruits as apples and peaches, and at present these are the most profitable crops grown. The price of this type varies according to the topography from \$5 to \$15 an acre.

^a Large samples of this soil obtained near Jackson and Mendon were subjected to tests by the wire-basket method, to determine the manurial requirements of this type. The fields from which the samples were taken had been under cultivation for some time without the addition of fertilizers or green manure, though in one case a little stable manure had been used. The largest increase in plant growth was produced by the use of stable manure, being slightly greater than that secured where cowpea vines and lime were used. A complete fertilizer with lime was superior to fertilizer without the addition of lime. Lime used alone gave some increase. The results suggest the wisdom of growing legumes and plowing them under in a green state, first giving the fields a dressing of lime. While held strictly applicable only to the fields from which the samples were taken, it is believed these results are suggestive of the best methods of treating this soil throughout the county.

The following table gives the average results of mechanical analyses of typical samples of the soil and subsoil of the Lexington silt loam :

Mechanical analyses of Lexington silt loam.

Number.	Description	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>
15001, 15003.....	Soil	0.1	1.8	1.9	3.3	10.0	65.1	17.2
15002, 15004.....	Subsoil.....	.1	.5	.7	1.1	4.6	57.9	35.0

WAVERLY SILT LOAM.

The soil of the Waverly silt loam consists of about 10 inches of silt loam, varying in color from light to dark brown, according to the quantity of organic matter present. The subsoil grades into a heavy silt loam of a gray color, usually mottled with yellow iron stains. Varying quantities of iron concretions are found scattered over the surface of this soil and disseminated through both the soil and subsoil.

While the type, as a whole, is quite uniform, the texture of the soil is sometimes modified by local conditions. Areas bordering the uplands are occasionally influenced by material washed from the upland formation. Areas of this phase of the soil are usually better drained than much of the type, and are not so subject to overflow as the greater part of the type. The sand content varies considerably, ranging from almost pure sand to a typical silt loam within areas less than 2 or 3 acres in extent. Promiscuously scattered through the Hatchie River bottom are small areas of what is known locally as "buck-shot" or "crawfish" land. This soil is a grayish-white, fine, silty loam, underlain by a plastic, impervious, heavy, silty clay of a drab color mottled with yellow iron stains. But few of these "buckshot" areas are found along the two forks of Deer River. Neither of these phases is of sufficient extent to justify mapping as a separate soil type.

The main bodies of the type are found in strips varying from one-half mile to $1\frac{1}{2}$ miles in width along the Middle Fork and South Fork of Deer River. The type also occurs along some of the smaller streams found in the more level section of the county.

The topography is level. Usually immediately bordering the uplands there is a slight slope toward the streams. Occasionally there is a low, wet, basinlike depression lying between the streams and the uplands.

The Waverly silt loam is poorly drained and subject to annual overflow from the streams traversing it, which have an average fall of about 3 feet per mile. Their channels are shallow and tortuous and often obstructed by logs and other drift material, thus greatly

impeding their flow and causing them to leave their banks readily in times of heavy rainfall. An artificial drainage system will have to be installed before this type can be successfully cultivated.

The Waverly silt loam is an alluvial soil formed from material deposited by streams in times of overflow, mingled in places bordering the higher lands with material washed down from the surrounding uplands.

The type is very largely covered with a heavy growth of timber, a considerable part of which is merchantable. This growth consists mainly of oak, beech, black and sweet gums, cypress, and tulip poplar. It is believed that receipts from the sale of timber would about equal the expense of clearing.

A very small proportion of this type is under cultivation. If well drained it is believed that it would be one of the strongest soils in the area for general farming. It is especially adapted to the production of hay and other forage crops. Large yields of cotton and corn could also be secured if the soil were properly drained.

The agricultural value of the Waverly silt loam depends largely upon the location and the natural drainage, the prices varying from \$5 to \$25 an acre.

The average results of mechanical analyses of representative samples of the soil and subsoil of this type are given in the following table:

Mechanical analyses of Waverly silt loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>
15013, 15015.....	Soil	0.2	1.0	1.2	4.3	7.3	62.7	22.9
15014, 15016.....	Subsoil.....	.4	1.4	1.4	4.4	9.4	61.4	21.4

WAVERLY LOAM.

The Waverly loam is a brown loam, having a depth of about 10 inches, underlain by a light-brown loam of slightly heavier texture. The sand and silt content varies considerably with local conditions, being influenced by material washed from the different geological formations, through which the streams draining this type have cut their channels. The variable areas more often have the characteristics of a heavy sandy loam. Frequently local areas occur in which the several grades of sand largely predominate, but such areas are too small to be mapped with any degree of accuracy.

A very large part of this type occurs along streams intersecting the Lexington silt loam in the hilly section of the county and in the more rolling areas mapped as Memphis silt loam.

In topography the Waverly loam varies from a gentle slope toward the streams to level in the wider parts of the bottoms adjoining the Waverly silt loam. The type as a whole is fairly well drained. The wider parts of the bottom lands usually require tile drainage to secure the best results. The larger part of this type is subject to overflow, but these inundations are usually of but a few hours' duration and are thus much less injurious than those occurring on the Waverly silt loam.

The Waverly loam is derived from material washed down from the surrounding uplands. The type, occurring as it does in the more hilly and eroded section of the area, is more largely affected by sandy materials derived from the Lafayette formation than the Waverly silt loam.

Many of the better drained areas of this type have been cleared of the native vegetation and placed under cultivation. The timber growth now found consists largely of oak, sweet and black gum, tulip, hickory and beech. But little of the timber is merchantable.

Cotton and corn are the principal crops grown and excellent yields are secured. Cotton yields from one-half to three-fourths bale per acre, while corn will average from 35 to 40 bushels. But little hay is grown, though when it is grown excellent yields are produced. Some of the truck crops are being grown on well-drained areas with good results.

The price paid for the Waverly loam varies considerably, according to location and condition of drainage. Few farms are located entirely upon this type, but where such is the case the prices range from \$5 to \$25 an acre.

The average results of mechanical analyses of typical samples of the Waverly loam are given in the following table:

Mechanical analyses of Waverly loam.

Number.	Description	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>
15009, 15011.....	Soil	0.6	3.5	6.2	14.9	10.6	48.0	16.0
15010, 15012.....	Subsoil.....	.1	2.9	4.9	11.5	9.5	49.9	20.6

SUMMARY.

Madison County covers an area of 359,104 acres, or about 561 square miles, and lies in the west central part of Tennessee. The eastern and southern parts of the county are rough and hilly and are little cultivated. The western and northern parts, comprising about two-

thirds of the county, are gently rolling. The county lies within the Mississippi River basin, and the drainage is toward the west.

The city of Jackson, the county seat, with a population between 15,000 and 20,000, is the only town of great importance, although there are a few small places that do considerable local trading. Jackson is centrally located and is one of the most important railroad points in west Tennessee, being situated on the Illinois Central, the Mobile and Ohio, and the Nashville, Chattanooga and St. Louis railroads. These roads furnish excellent facilities for reaching the northern and southern markets, and they so divide the territory that the greater number of the farmers are within 3 to 6 miles of a shipping point.

The county has expended over \$300,000 in macadamizing roads. Every road out of Jackson for a distance of 5 or 6 miles has been so improved, and the work is continuing under expert supervision. This is of inestimable value to the farmer and especially important where the shipment of perishable products promises to become a leading line of agriculture.

The climate is favorable to the growing of a wide variety of crops. The summers are long, the winters mild and short. Ordinarily the rainfall is ample for crop needs, and the occasional droughts occurring in the late summer and early fall seldom do serious damage to the crops. The average growing season is about two hundred and sixteen days.

Cotton and corn are the main crops, although a considerable acreage is in oats and wheat. Recently interest in the production of truck for outside markets has awakened. The soil is adapted to this industry, the climatic conditions are satisfactory, and the shipping facilities excellent. So far only a little truck has been sent outside the county, and the supply is really not yet sufficient to meet the local demand, but concerted effort of the growers and the cooperation of transportation companies, which should be readily secured, should soon put the industry on a firm commercial basis. Tomatoes, strawberries, raspberries, and currants are among the products easily grown.

The growing of orchard fruits is another line along which the farmers of the county can specialize to advantage. Several thrifty bearing apple orchards were seen, and the returns from these orchards considering the investment are much greater than from any crop now grown in the area. The soils are also well adapted to grapes.

The agricultural methods are not of the best. Little attention is paid to the rotation of crops. Many fields are planted in cotton or corn year after year. No effort is made to prevent the serious erosion which takes place in the more hilly sections.

The labor employed is both white and colored, and is not in sufficient supply to meet the demand. Most of the help is hired by the day, and receives from 75 cents to \$1 a day.

A large percentage of the farms are operated by the owners. But few farms are rented for cash, the common practice being to rent on shares. The average size farm is about 81 acres.

The soils of Madison County are divided naturally into upland and bottom-land soils. Two types have been recognized in each of these physiographic divisions. The upland soils—Memphis silt loam and Lexington silt loam—are derived from the mantle of loess which overlies the Lafayette formation to a depth of from 2 to 15 feet. The bottom-land soils—Waverly loam and Waverly silt loam—are the result of wash from the surrounding uplands and of sediments carried by the rivers.

The Memphis silt loam is the most extensive soil type in the county. Its surface is gently rolling and it has good drainage. Cotton and corn are the main crops grown. Cotton averages from two-fifths to three-fifths of a bale and corn from 20 to 35 bushels per acre. Clover yields about 2 tons of hay to the acre, but it is difficult to get a good stand of this crop. The soil is well adapted to strawberries and vegetables, especially tomatoes. Apples and peaches do well. This is the highest-priced land in the county, bringing from \$15 to \$75 an acre, according to location.

The Lexington silt loam is very hilly, the greater part of the type consisting of long, narrow, winding ridges, forming divides between numerous stream courses. It is subject to serious erosion, and is excessively drained. But little of it is under cultivation. The price varies from \$5 to \$15 an acre.

The Waverly silt loam, which occurs principally along South Fork Deer River, is very poorly drained, and practically uncultivated. The drainage of this land is one of the most important problems in the county. If the river should be deepened and straightened and the water removed from these bottoms, thousands of acres of the most fertile land in Tennessee would be made available. The drainage would also make more accessible much valuable timber.


The Waverly loam varies from gently sloping to level areas, and as a whole is well drained. Cotton and corn are the principal crops. Cotton yields from one-half to three-fourths bale and corn from 35 to 40 bushels per acre. The type also produces excellent yields of hay. The price of this soil varies from \$5 to \$25 an acre, according to location.

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Waverly
silt loam




Sil

Hsil

LEGEND


1 Silt loam
2 Heavy silt loam
3 Loam

LEGEND




Memphis
silt loam

L
Lexington
with 1000



Waverly loam



Ws
Waverly
silt loam

Scale 1 inch = 1 mile

Field Operations
Bureau of Soils
1906